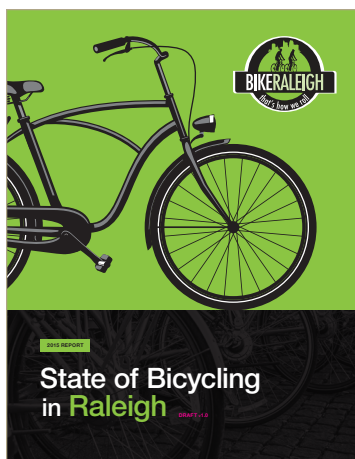


# Existing Conditions

Bicycling in Raleigh has evolved since the 2009 Bicycle Plan and continues to evolve.

The 2009 Plan provided a framework for infrastructure, institutional, program, and policy investments that has led to Raleigh's bronze-level Bicycle Friendly Community status. Significant progress has been made since 2009 on building the envisioned bicycle network and elevating the profile of bicycling as a viable means of transportation in Raleigh.



*The State of Bicycling in Raleigh Report was developed jointly with this Bike Plan Update. It is a standalone document and an appendix to this Plan.*

This chapter provides a snapshot of the status of bicycling in Raleigh today and the needs and deficiencies that still exist. A separate, stand-alone 2015 “State of Bicycling in Raleigh Report” contains further information regarding the accomplishments in the Five E’s: Engineering, Education, Encouragement, Enforcement, and Evaluation. The report includes a map evolution of the bicycle network from 2009-2015 and timelines for accomplishments in the Five E’s. It features photographs of infrastructure and programming activities. It can also be found as an appendix to this report.

## REVIEW OF ACCOMPLISHMENTS FROM 2009 PLAN

The City of Raleigh has steadily accelerated their bicycle program by committing staff time and resources to the Five E’s. The City has also taken advantage of grant funding and other opportunities such as roadway resurfacing to install bicycle lanes. In addition, the Parks Recreation and Cultural Resources Department has continued to expand its greenway system to well over 100 miles of shared-use paved paths at the time of this study, offering further riding opportunities. The following assessment of 2009 action step completion is organized by the key action steps and the Five E’s.

For the expanded and detailed 2009 Plan Action Steps Table and accomplishment status, see Appendix X.

**2009 ACTION STEP ASSESSMENT****KEY ACTION STEPS****CREATE BPAC****HIRE BIKE/PED COORDINATOR****BECOME BICYCLE-FRIENDLY  
COMMUNITY****ENGINEERING****ESTABLISH CIP FUNDING AND  
SECURE OTHER FUNDING****COMPLETE PRIORITY PROJECTS****NCDOT COORDINATION****EXPAND GREENWAYS****UPDATE SIGNED ROUTE SYSTEM****PROVIDE MORE BIKE PARKING****APPLY FOR BIKE PARKING/  
LOCKER GRANTS****BUILD BIKE STATION FOR SECURE PARKING****MAINTAIN BIKE FACILITIES****EDUCATION****CREATE BIKE CURRICULUM****BEGIN BIKE AMBASSADOR PROGRAM**

Key: ✓ = complete; 🖐 = on track; ✕ = not on track

## 2009 ACTION STEP ASSESSMENT

START BIKE RODEOS	✓
CONDUCT INTERNAL STAFF TRAINING	✗
START MEDIA CAMPAIGN	✓
<b>ENCOURAGEMENT</b>	
DEVELOP RALEIGH BIKE MAP	✓
EXPAND SAFE ROUTES TO SCHOOL	✓
PROMOTE BIKE TO WORK MONTH	✓
FEATURE BIKE EVENTS/RIDES	✓
<b>ENFORCEMENT</b>	
ESTABLISH HOTLINE	✗
TARGET ILLEGAL BEHAVIORS	👉
TRAIN LAW ENFORCEMENT	✓
CREATE BIKE PATROL	✓
<b>EVALUATION</b>	
FACILITY DEVELOPMENT	✓
MORE BICYCLISTS	✓
MORE PROGRAMS	✓
INSTITUTIONAL SUPPORT	✓
FEWER COLLISIONS	👉

Key: ✓ = complete; 👉 = on track; ✗ = not on track

## NETWORK CONNECTIVITY AND GAP ANALYSIS

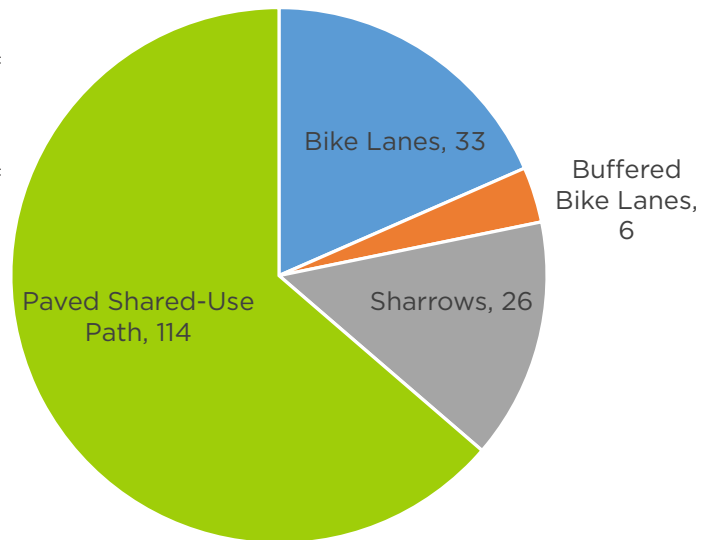
As of 2015, the total bicycle network is over 180 miles of both greenway and on-road facilities. The on-road bicycle network is nearly 70 miles, with 33 miles of bicycle lanes, 6 miles of buffered bicycle lanes, and 26 miles of sharrows. The off-road shared-use path network is 114 miles. Maps showing the evolution of Raleigh's bicycle network from 2009 to 2015 can be found in the *State of Bicycling in Raleigh Report*.

### BICYCLE NETWORK GAPS

Despite implementation progress between 2009 and 2015, there are still many gaps in the city's planned bicycle network. The gaps exist in various forms, ranging from short missing links to large voids in bicycling facilities. For the purposes of this Plan, there are three types of gaps:

- » **Crossing gaps** are bicycle-related intersection improvements needed for major roadway crossings (at-grade and grade-separated).
- » **Network gaps** are missing links in the network that are less than ½ mile in length.
- » **Corridor gaps** are larger geographic areas lacking any bicycle facilities. These gaps often include corridors that connect neighborhoods to destinations and other bicycle facilities such as shared-use paths.

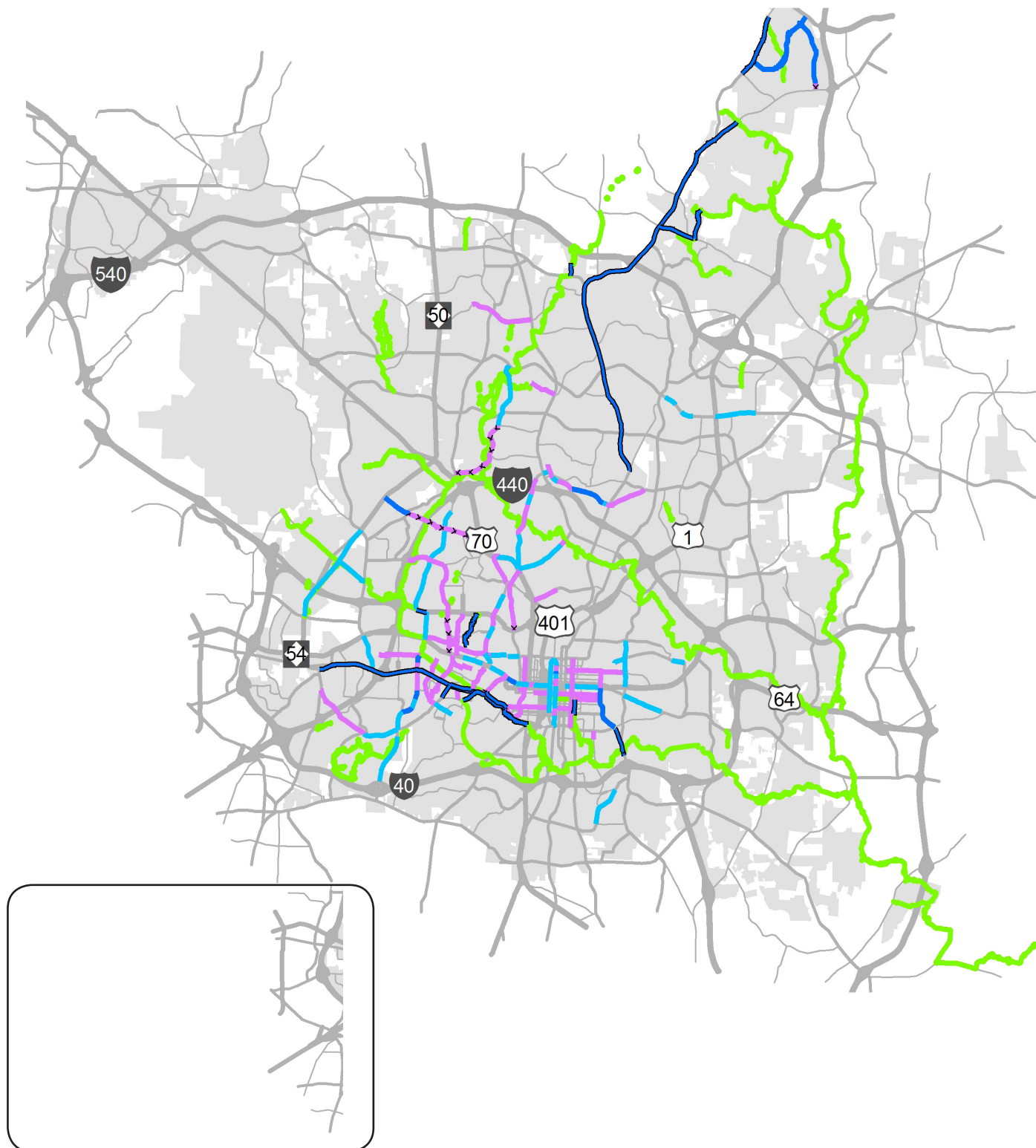
**Bike Facility Mileage**



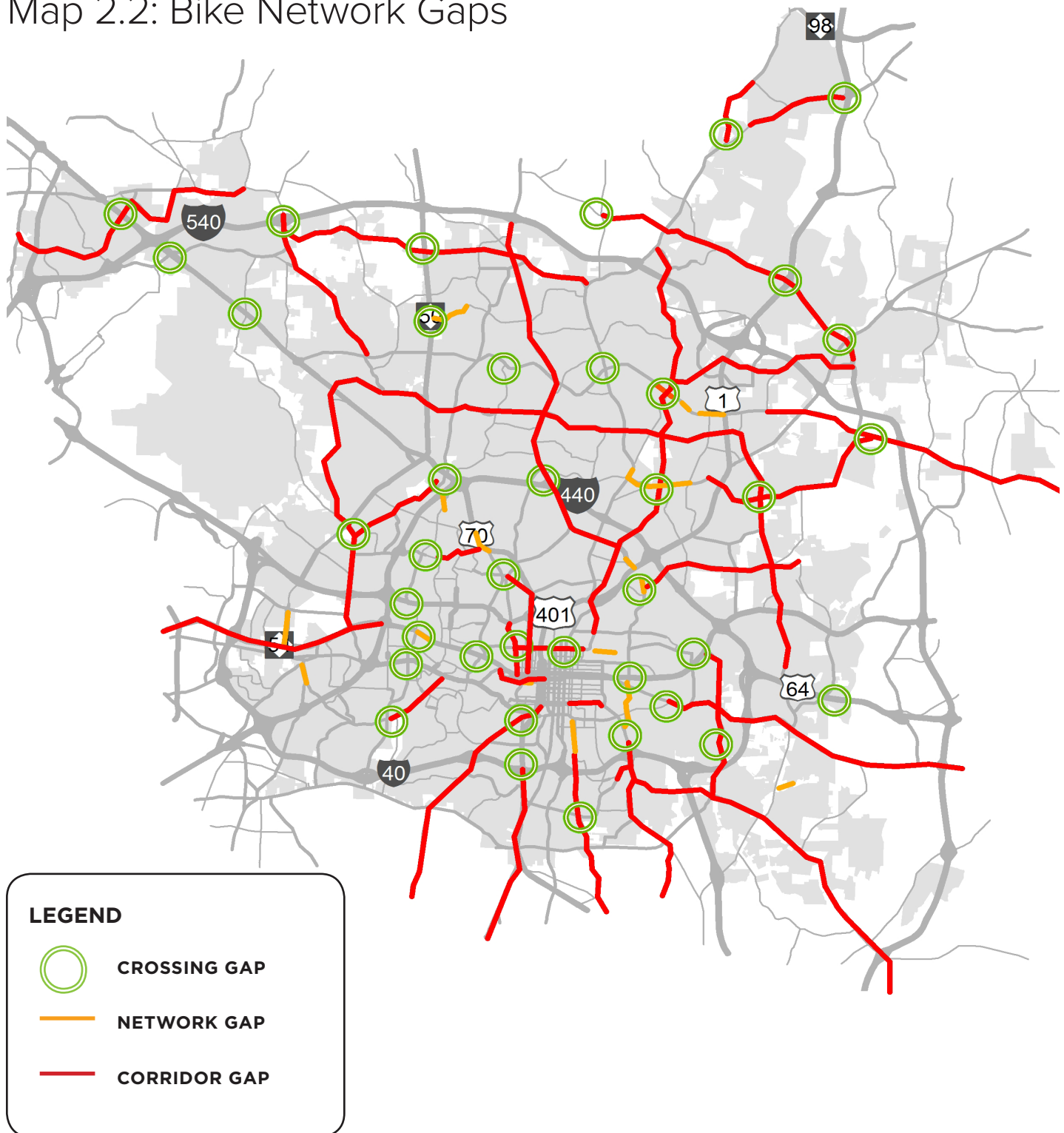
*St. Mary's Street is a popular bicycle route. Although sections have shared lane markings, the corridor lacks quality facilities along several key sections from Glenwood Avenue to downtown.*



Map 2.1: Existing Bike Network



Map 2.2: Bike Network Gaps





*Greenway trails, such as the Walnut Creek Trail, is assigned an LTS level 1 as they are perfect for most beginner riders.*



*Although Avent Ferry Road has bike lanes, it is still assigned an LTS 4 due to high traffic volumes, number of travel lanes and the posted speed.*

## LEVEL OF TRAFFIC STRESS

A bicycle network is likely to attract a large portion of the population if its fundamental attribute is low stress connectivity. In other words, a network should provide direct routes between origins and destinations that do not include links that exceed one's tolerance for traffic stress. Each user is different and will tolerate different levels of stress in their journey so the following maps should be used as a general guide rather than an absolute truth.

The methods used for the Level of Traffic Stress Analysis were adapted from the 2012 Mineta Transportation Institute (MTI) Report 11-19: Low-Stress Bicycling and Network Connectivity. The approach used the following variables to classify roadways:

- » posted speed limit
- » the number (and width) of travel lanes
- » the presence of bicycle lanes
- » traffic volume

The following descriptions match the numbered key found in Maps 2.3 and 2.4:

- » LTS 1 is assigned to roads that would be tolerable for most children to ride, and could also be applied to multi-use paths that are separated from motorized traffic.
- » LTS 2 roads are those that could be comfortably ridden by the mainstream adult population.
- » LTS 3 is the level assigned to roads that would be acceptable to current confident bicyclists
- » LTS 4 is assigned to segments that are only acceptable to “fearless” bicyclists, who will tolerate riding on roadways with higher motorized traffic volumes and speeds.



Map 2.3 Citywide Level of Traffic Stress



## GROWTH IN CYCLING

The most reliable source of mode share data is the U.S. Census Bureau (American Community Survey) which reports the number of commuters by mode of transportation. When looking at the trendline, the data shows that the number of workers commuting to work by bicycle generally increases from 1990 to 2013. The bicycle mode share drop in 2013 highlights the inherent likelihood of data error with American Community Survey data. The data is best used as a tool to evaluate bicycle mode share trends (blue-dashed line in graph below). Anecdotally, evidence that the culture of bicycling has continued to grow can be seen through the clear demand for bike parking, especially in the downtown area.

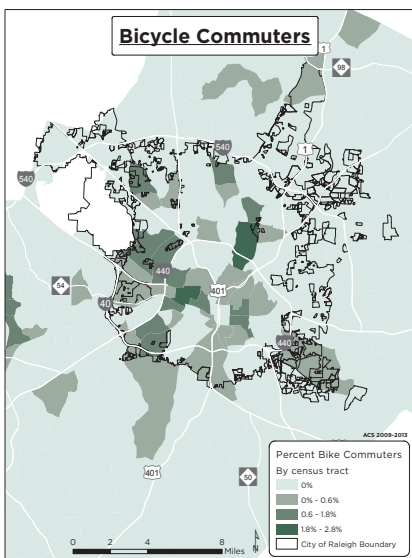
### ACS BICYCLE MODE SHARE



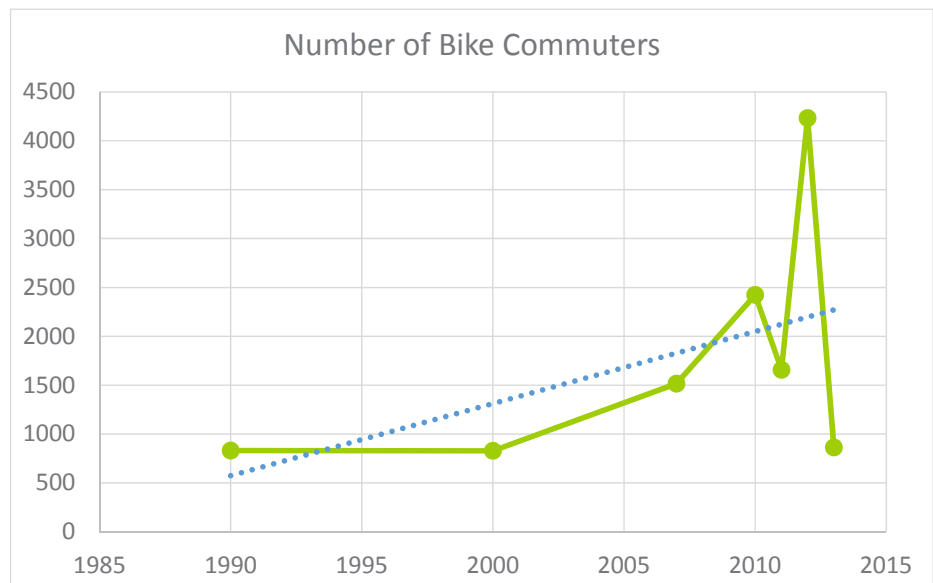
The Hargett Street bike corral is well utilized.

1990 - 0.4%  
2000 - 0.3%  
2007 - 0.4%  
2010 - 0.6%  
2011 - 0.4%  
2012 - 1.0%  
2013 - 0.2%

## Map 2.4 Bike Commute Mode Share



Bicycle mode share by census tract (Data from ACS 2009-2013). The highest mode share is 2.8%.



The blue-dashed line is the trendline which is moving upwards.

## SAFETY ISSUES

Bicycle crashes were mapped and examined for the period January 2007-March 2015 and compared to crash data analyzed in the previous bicycle plan (January 2000-December 2006). Generally, the density of bicycle crashes was highest in very similar areas; however, there was a sharp increase in the Downtown, likely due to increased bicycling there.

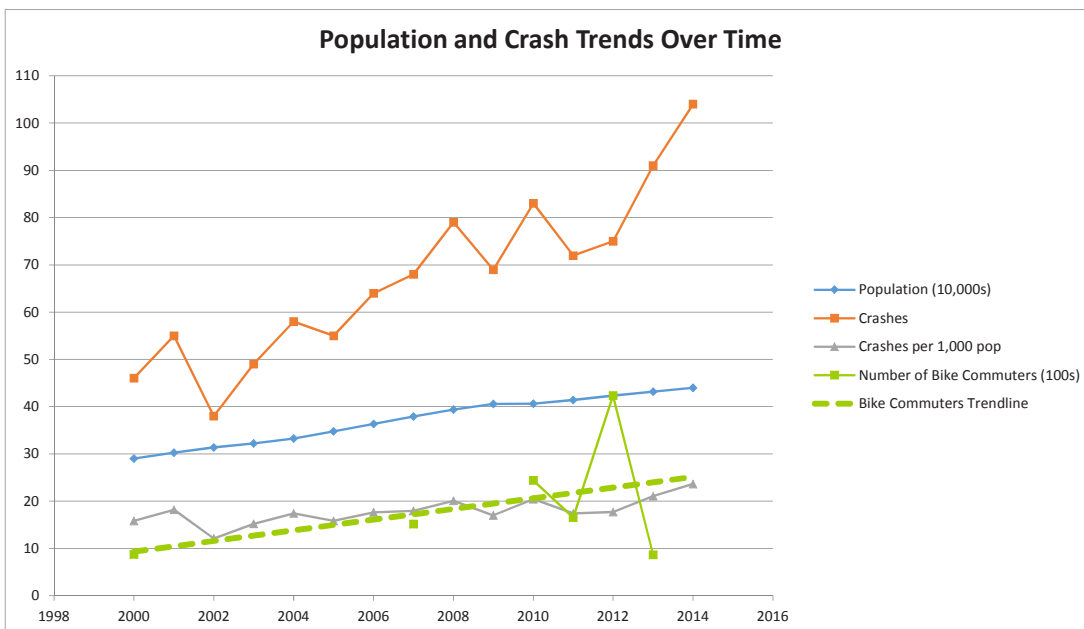
Annually, between 2007-2015, an average of 78 bicycle crashes were recorded. Over the entire period, 23 of these crashes led to a disabling injury with 9 leading to fatalities. From 2000-2006, an annual average of 52 bicycle crashes occurred (5 fatalities and 12 disabling injuries).

AVERAGE YEARLY CRASH RATE  
PER 10,000 POPULATION:

2000-2006: 1.61

2007-2015: 1.89

While it appears bicycle crashes increased dramatically between the two periods, it's important to note: 1) overall population growth, and 2) increased bicycle exposure. The chart below highlights those trends.



## TOP CRASH CORRIDORS

### 2000-2006

Hillsborough - 26  
New Bern - 16  
Avent Ferry - 13  
Dan Allen - 13  
Falls of Neuse - 12  
Six Forks - 12  
Spring Forest - 11

### 2007-2015

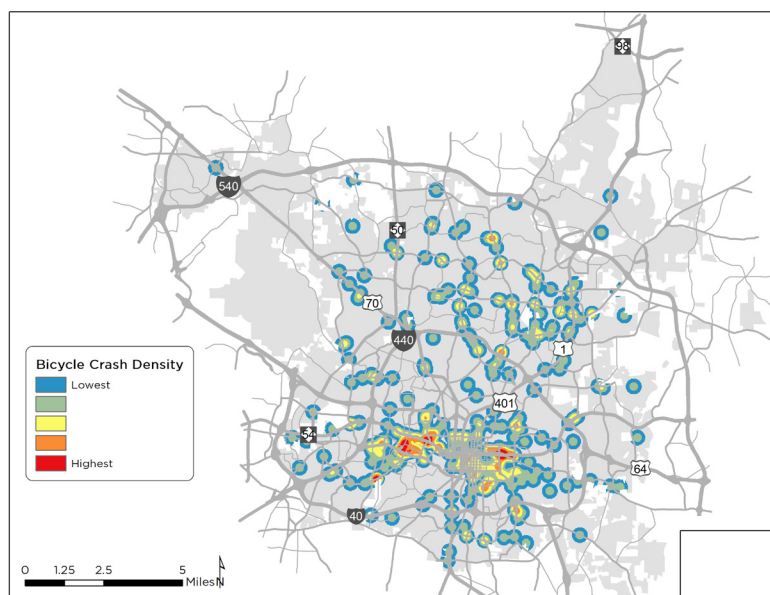
Hillsborough - 62  
Dan Allen - 17  
Avent Ferry - 14  
Capital - 14  
Western - 13  
Glenwood - 12  
New Bern - 12



## TOP CRASH LOCATIONS

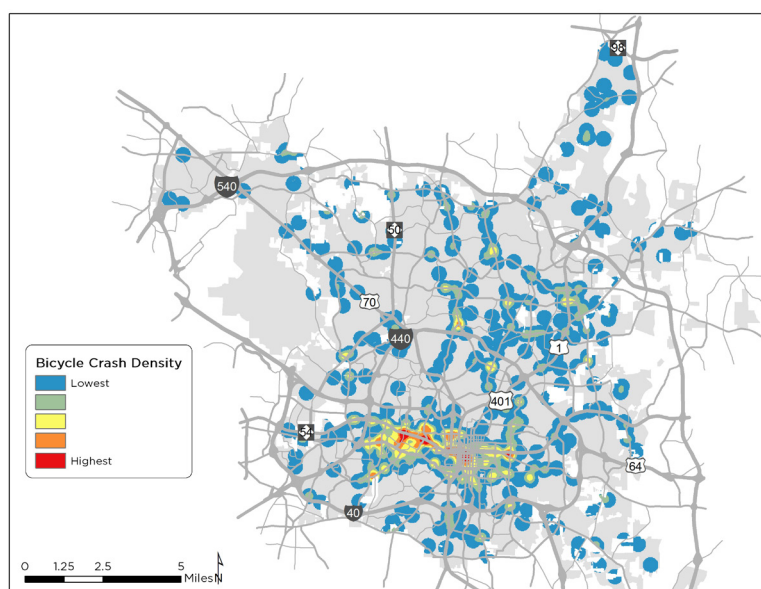
Hillsborough & Brooks (6)	Capital & Millbrook (4)
Hillsborough & Cox (6)	<b>Dan Allen &amp; Cates (4)</b>
Hillsborough & Dan Allen (6)	Dan Allen & Sullivan (4)
<b>Hillsborough &amp; Pullen (6)</b>	Glenwood & Tucker (4)
Six Forks & Lassiter Mill (5)	Glenwood & Hillsborough (4)
Hillsborough & Ashe (4)	<b>Hillsborough &amp; Oberlin (4)</b>
Avent Ferry & Centennial (4)	Six Forks & Wake Forest (4)
<b>Avent Ferry &amp; Trailwood (4)</b>	

*Locations above in black font were among the top crash locations between 2000-2006 as well.*

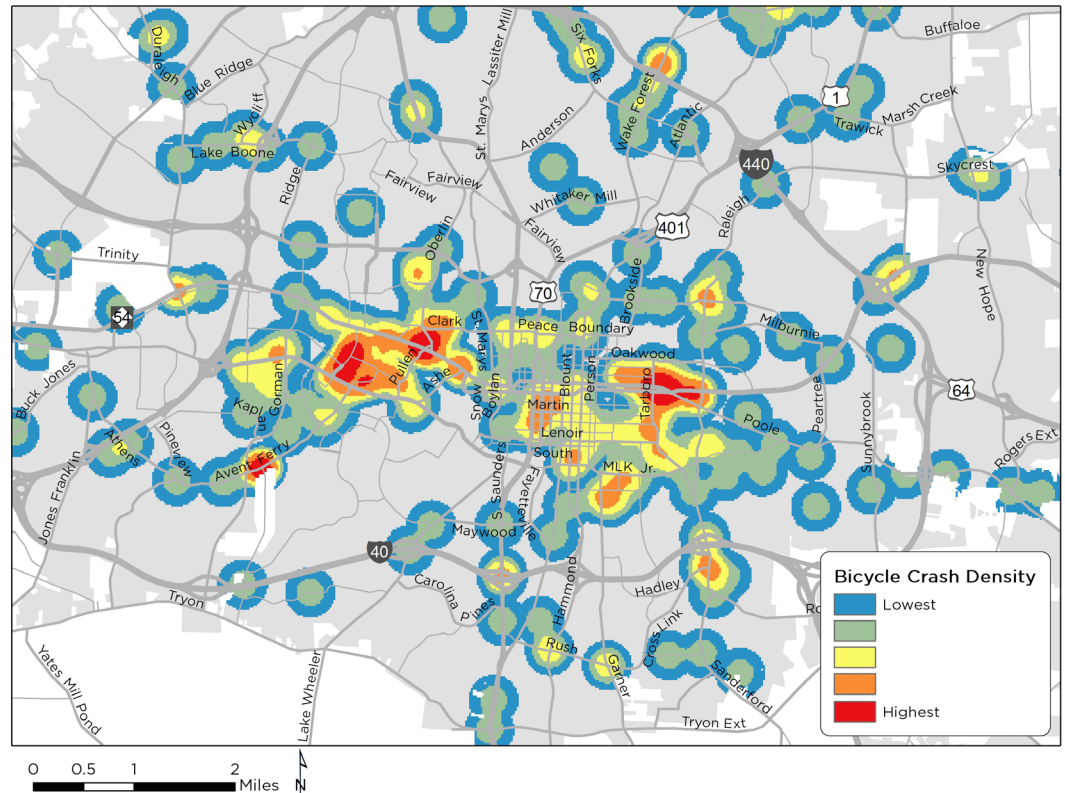


Map 2.5 Bicycle Crash Density (2000-2006) - Citywide

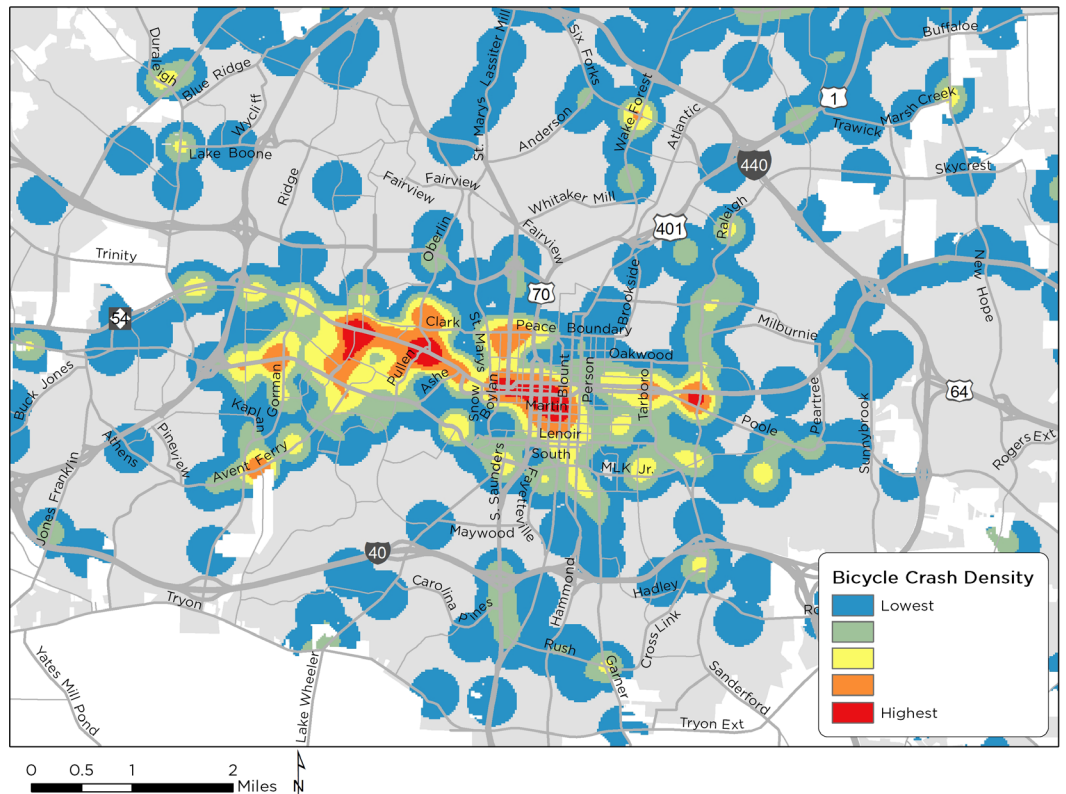
Map 2.6 Bicycle Crash Density (2007-2015) - Citywide

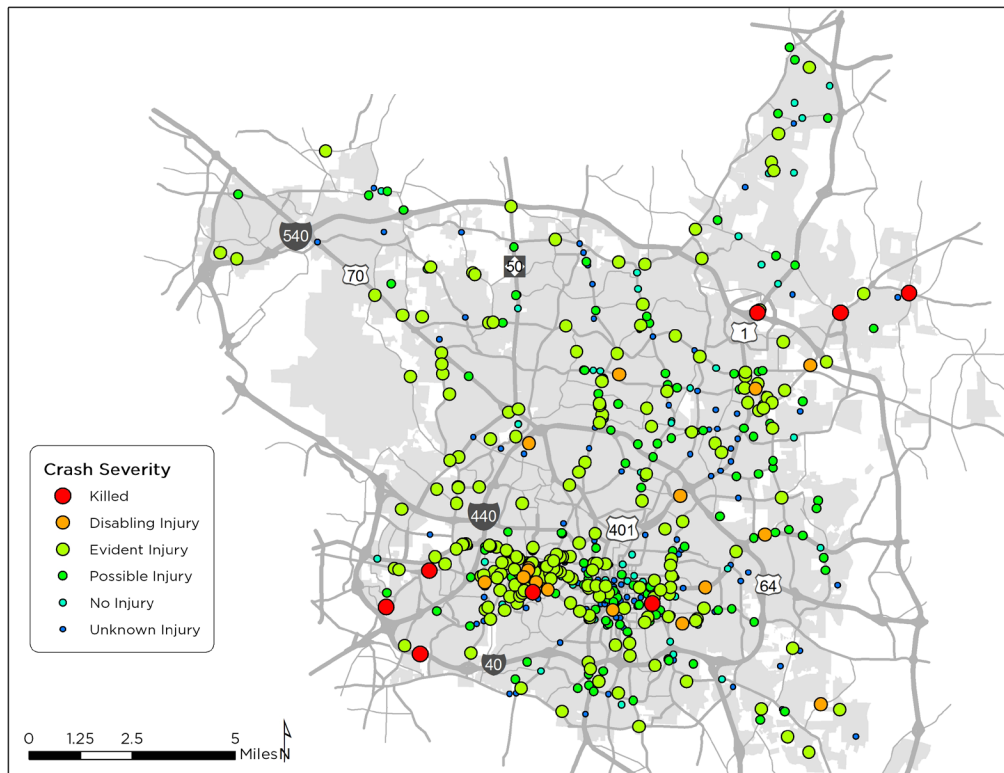


Map 2.7  
Bicycle  
Crash  
Density  
(2000-2006)  
- Inside  
Beltline



Map 2.8  
Bicycle  
Crash  
Density  
(2007-2015)  
- Inside  
Beltline





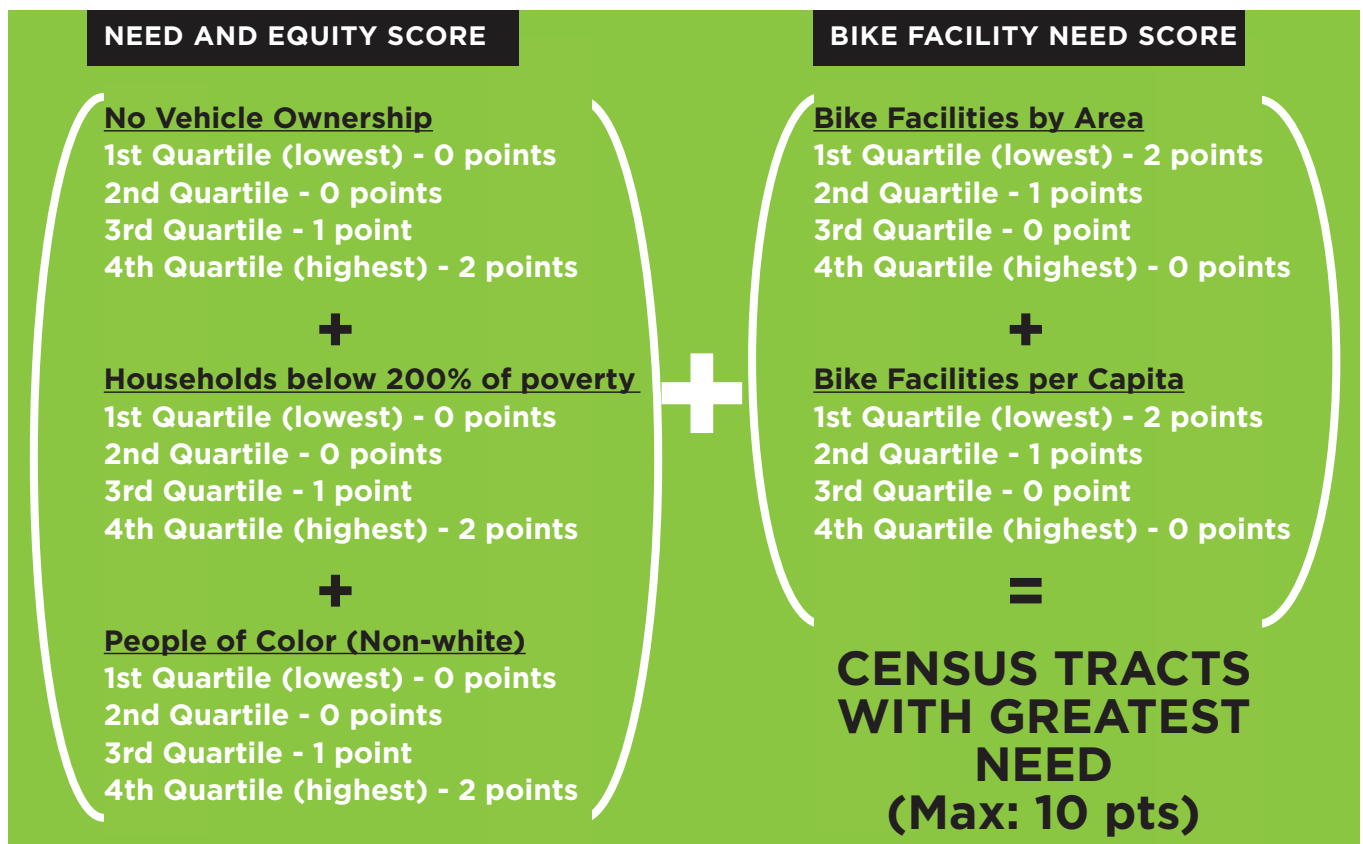
Map 2.9  
Bicycle  
Crash by  
Severity  
(2007-2015)  
- Citywide

## DEMOGRAPHICS/EQUITY ANALYSIS

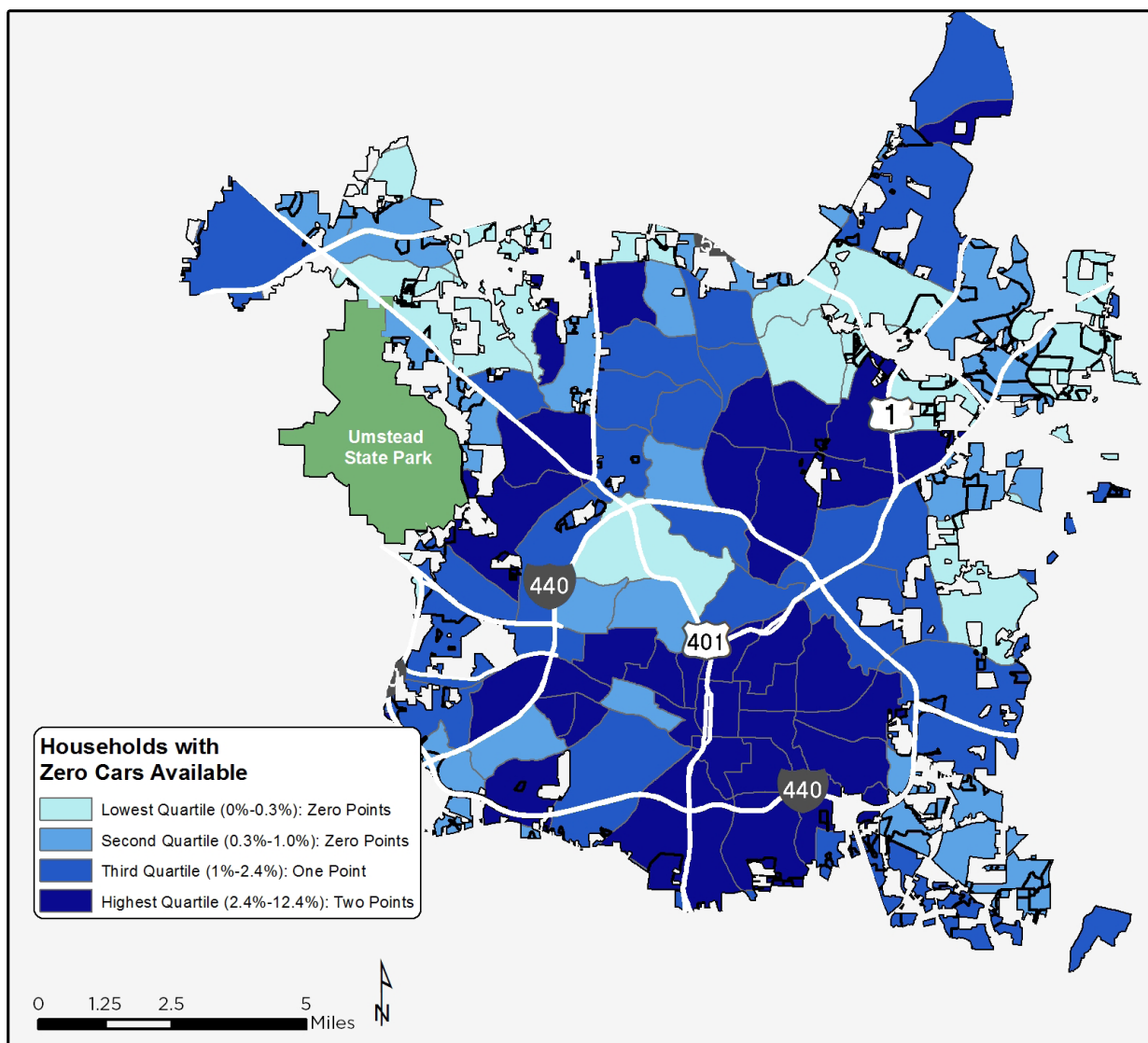
This plan includes a connected bicycle network that serves all areas of Raleigh, including areas that have a high density of populations for whom bicycling is a primary mode of transportation. An equity analysis examined the existing distribution of bicycle facilities compared to the distribution of these populations. For purposes of analysis, the following socioeconomic indicators define underserved populations, as shown on Maps 2.10-2.12:

- Percentage of households within the census tract with no automobile available for daily use
- Percentage of households below 200% of poverty level (defined by the U.S. Census Bureau)
- Percentage of population that are people of color (non-white)

In addition, an analysis of existing, available bicycle facilities (paved shared-use paths and on-road facilities) was conducted by geography and population to identify deficiencies in supply (Maps 2.13-2.14). The results of the demographic analysis combined with the assessment of existing facilities highlight several areas of Raleigh where improvements to the bicycle system would benefit populations and areas of potential need (Map 2.15).



## Map 2.10 Percentage of Households With No Automobile

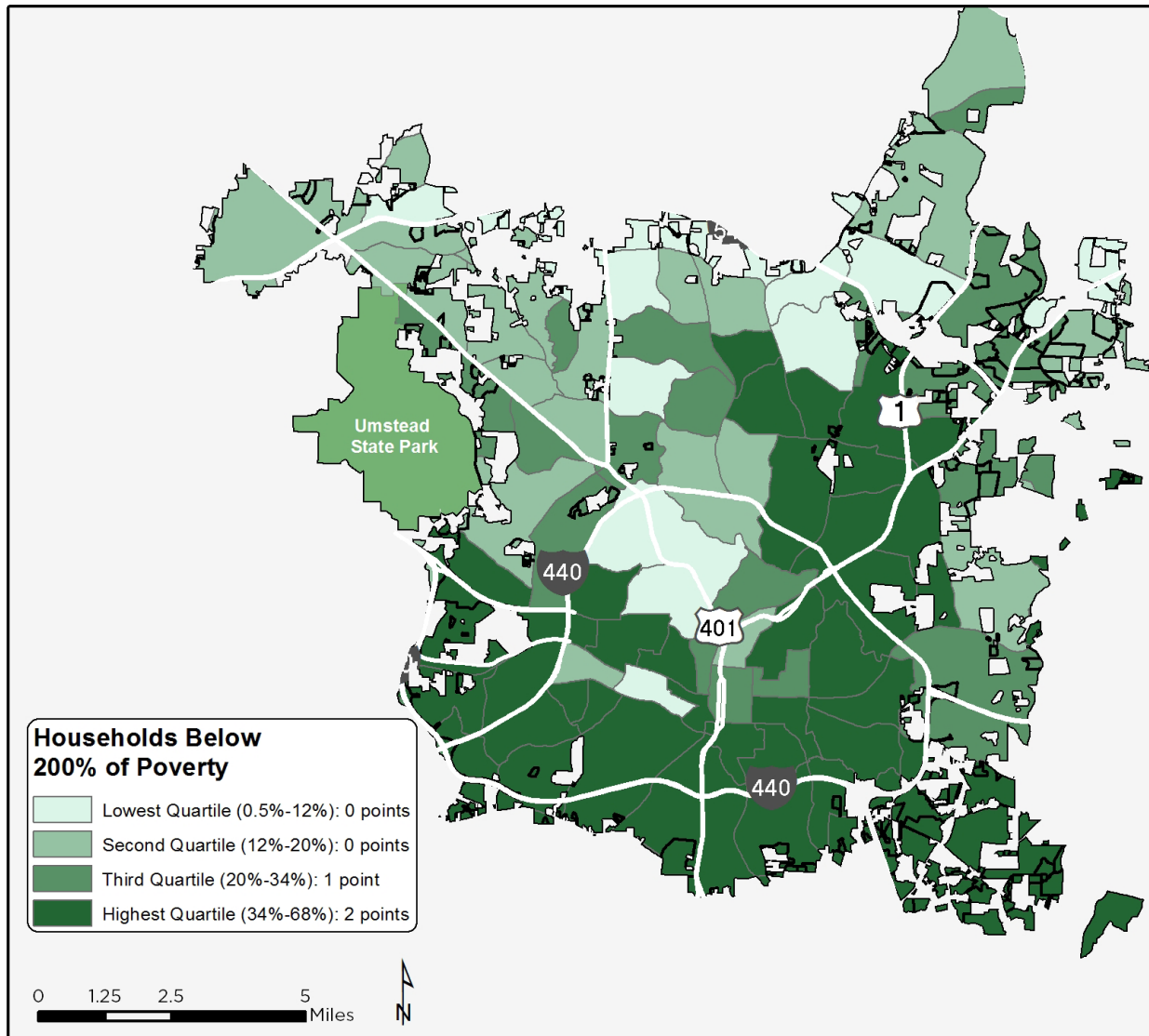


*Some portions of Raleigh, especially the eastern side of Downtown, have as high as 12% zero car ownership.*





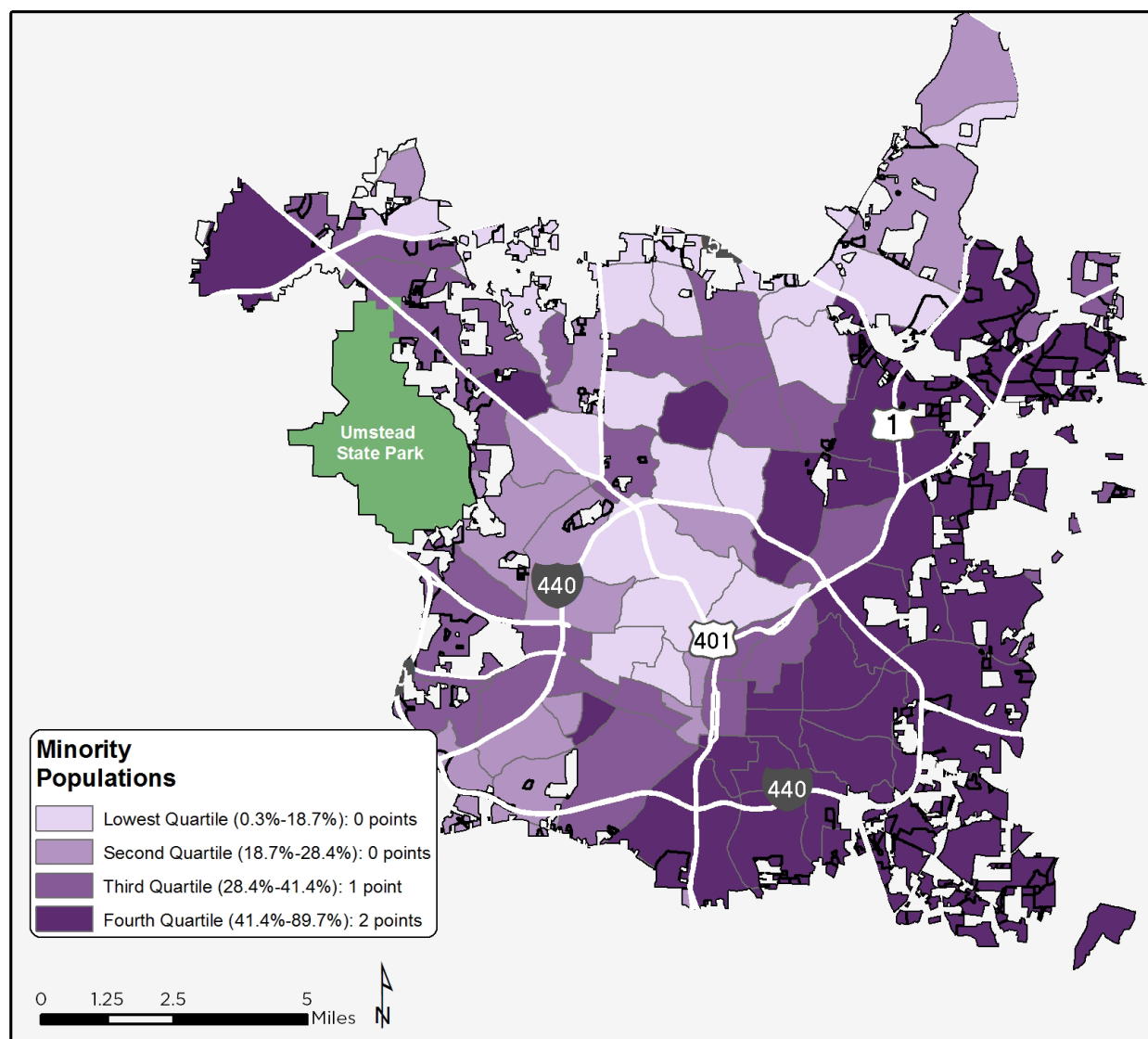
## Map 2.11 Percentage of Households Below 200% of Poverty Level



*According to 2012 ACS data, 16.4% of persons in Raleigh live below the poverty level. This map covers households that are twice the level of poverty or below.*

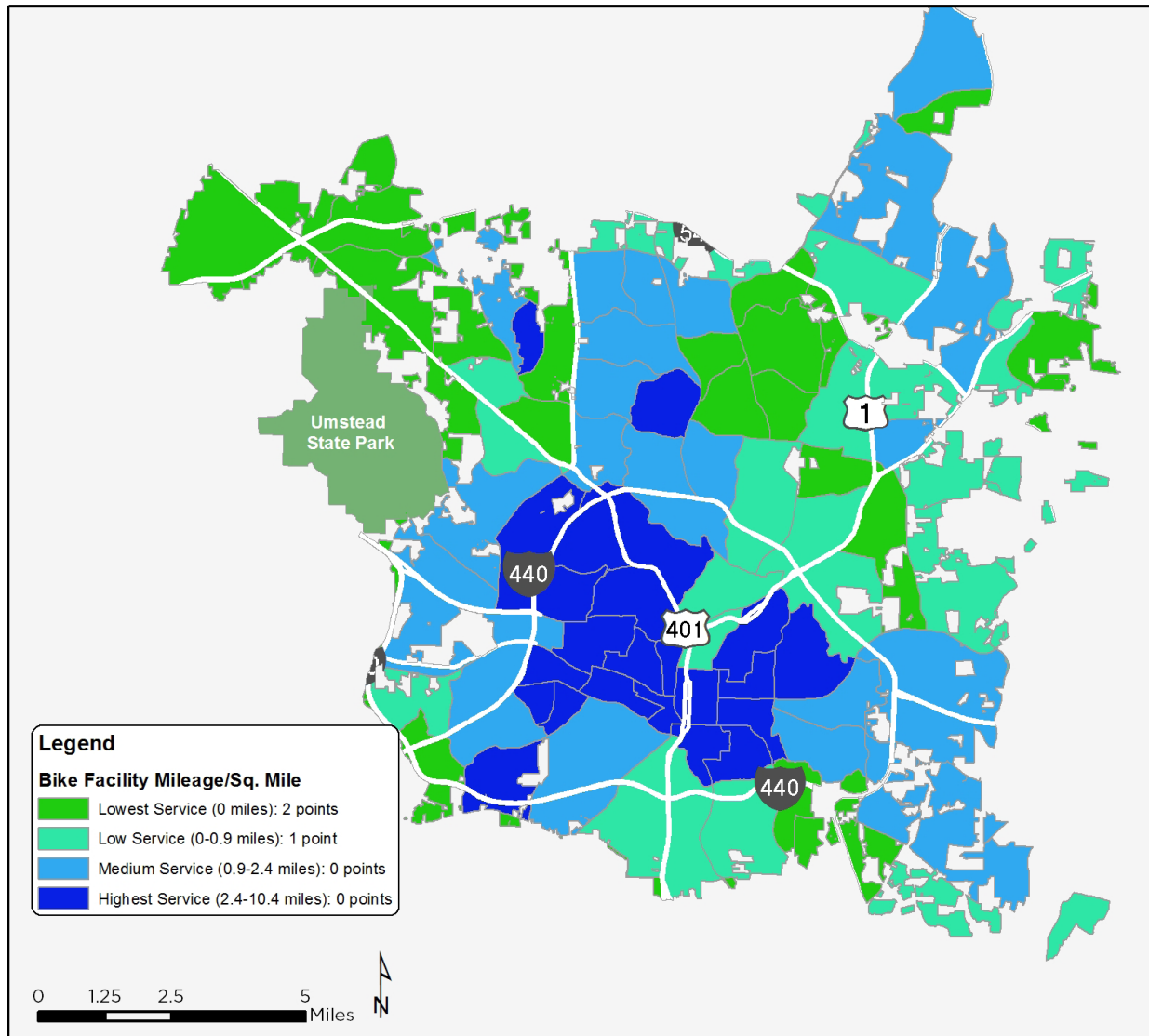


Map 2.12 Percentage of Population that are People of Color



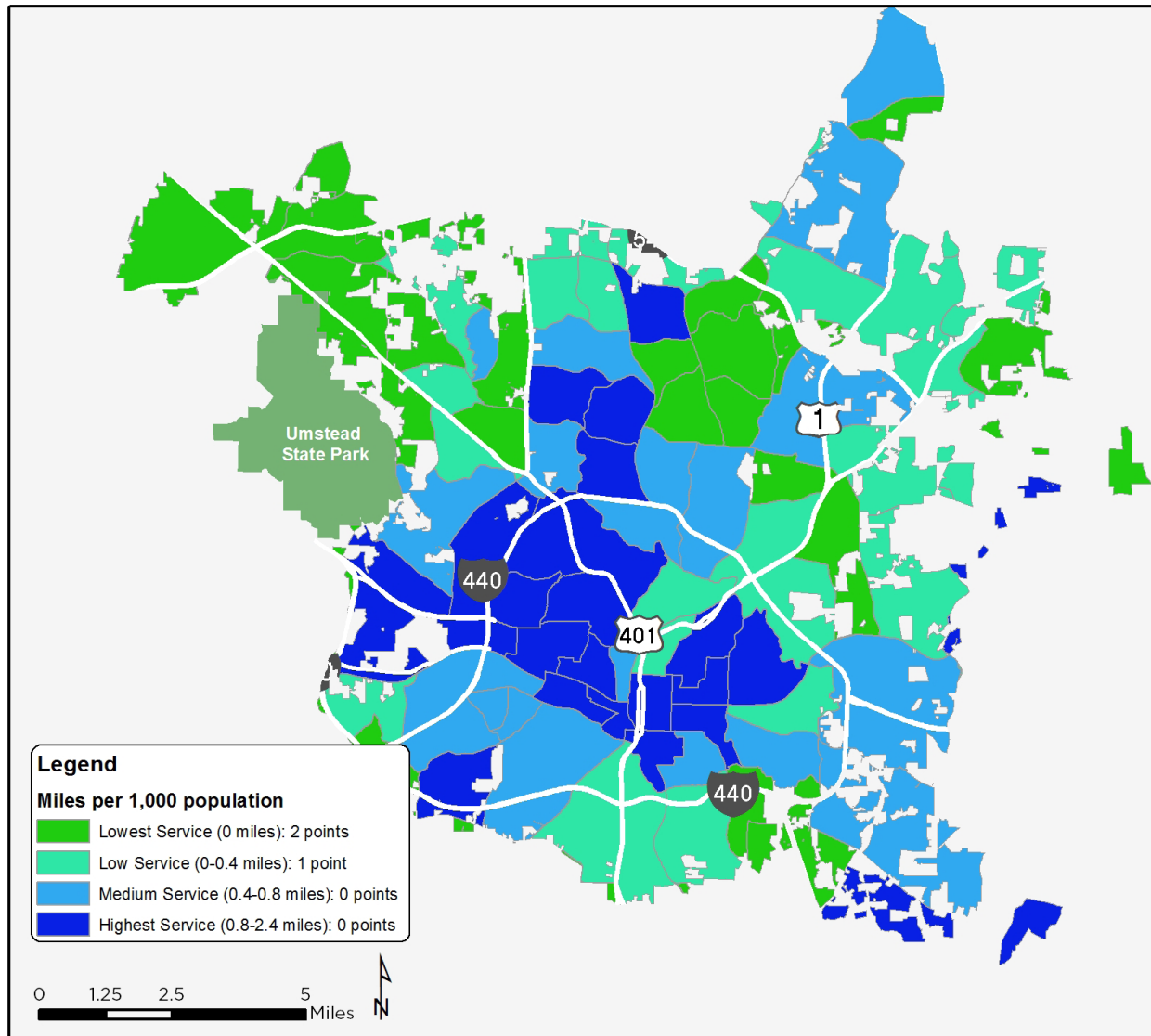
According to the 2010 US Census, 57.5% of Raleigh's population is white; 29.3% African-American; 11.4% Hispanic or Latino; 4.3% Asian; 6.2% other.

## Map 2.13 Bicycle Facility Miles per Area



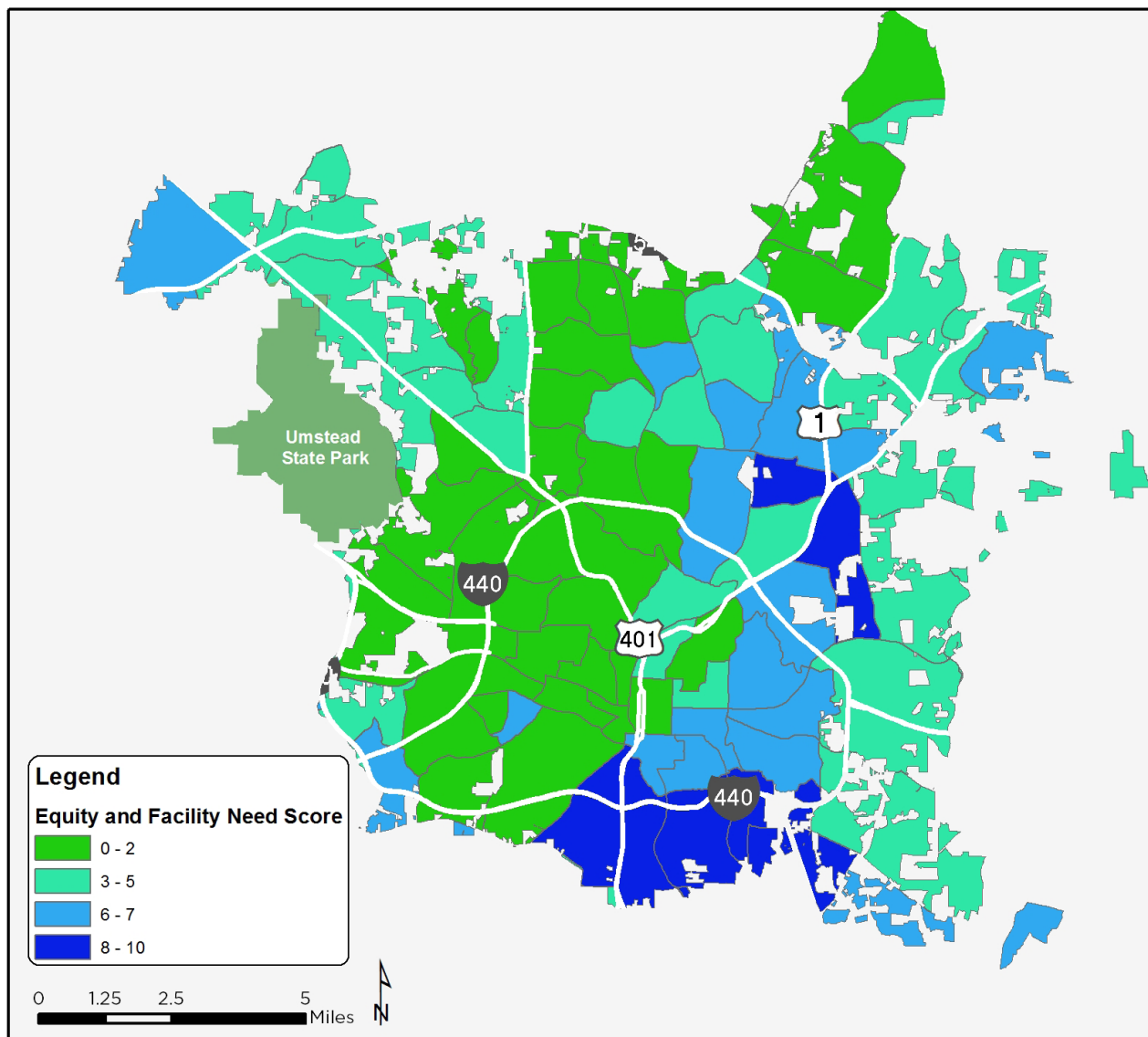
*The densest areas of bicycle facilities tend to be inside the Beltline.*

Map 2.14 Bicycle Facility Miles Per Capita



The highest concentrations of bicycle facilities by population are within the Beltline with some additional areas mostly north of the Beltline.

## Map 2.15 Equity and Bicycle Service



*Darker colors indicate concentration of areas where equity and need should be addressed. These areas primarily fall on a north-south axis on the eastern side of Downtown Raleigh. The highest scores are along and south of the Beltline. This scoring was used as a criteria in the prioritization ranking of bike network projects.*



Public input was received at Chavis Park on July 13, 2015.

## COMMUNITY-IDENTIFIED NEEDS

The public outreach process included five major components:

- Steering Committee Meetings
- Public Events/Open Houses
- Project Website
- Interactive Online Map (part of project website)
- Cityzen Comment Form (online and hard copy)

The major themes and community priorities identified through these outreach processes are reflected in this section. For more detailed results of each forum, see Appendix X.

## GENERAL THEMES

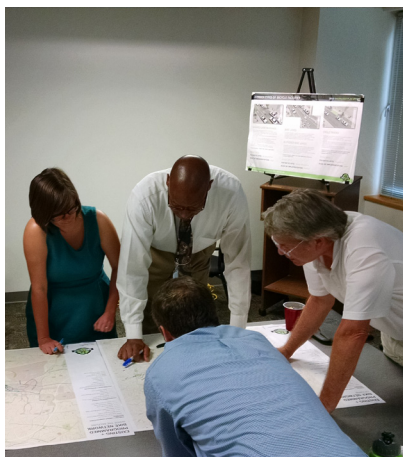
While the project team received a broad range of comments and suggestions, clear themes emerged related to the overarching vision for a more bicycle-friendly Raleigh and the key opportunities and constraints relevant to achieving that vision. The comments from citizens and stakeholders are organized into general categories below:

### General Bicyclist Needs and Comments

- Stakeholders and citizens want safer places to bike for the “Interested but Concerned” crowd (more greenways, cycle tracks, and buffered bike lanes). Sharrows are not enough.
- Better connectivity is needed so that people can bike from home to work, the store, school, or a greenway.
- Bicyclist and trail user education and etiquette should be improved.
- There are large gaps in the bicycle network in E/NE Raleigh and outside the Beltline.
- Greenways are the best place to bicycle in Raleigh.

### Barriers and Constraints

- Major barriers include I-440, I-540, US 70, and S. Saunders Street
- Cars often park in the middle of bicycle lanes.
- Bicycle lanes need to be swept and cleaned more frequently.
- Vehicular traffic and behavior is a challenge to bicycling.
- Greenway operating hours should be extended for bicycle commuters.



The Steering Committee met five times and guided the planning process.

Key Destinations and Target Areas

- The bicycle network should connect with transit and employment centers.
- Connect Cary with Raleigh via Hillsborough Street.
- Connect NC State with areas south of I-40.
- Connect to the greenway system.
- Connect downtown to Northeast Raleigh

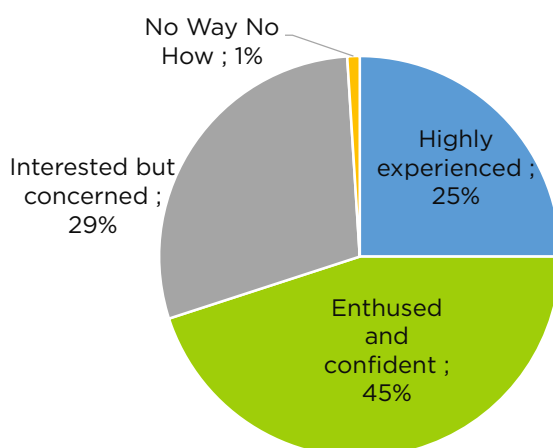
Partners and Implementation

- The business community should be engaged and involved.
- There is a need to continue expanding programs to encourage more bicycling.
- The focus should be on the highest quality projects that will encourage more ridership.

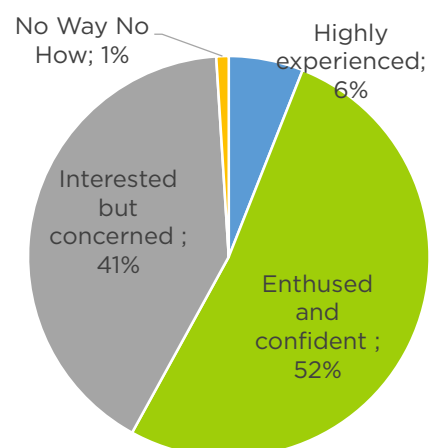
**CITYZEN COMMENT FORM TRENDS**

CityZen is a polling platform that the City of Raleigh has utilized to collect, understand, and leverage their online audience data. Combining the Cityzen online comment tool with hardcopy copy comment forms allowed an opportunity to identify the type of bicyclists participating. Despite a higher number of experienced cyclists participating, their desire is still to plan for the less-experienced bicyclists in the future.

**What type of bicyclist are you?**

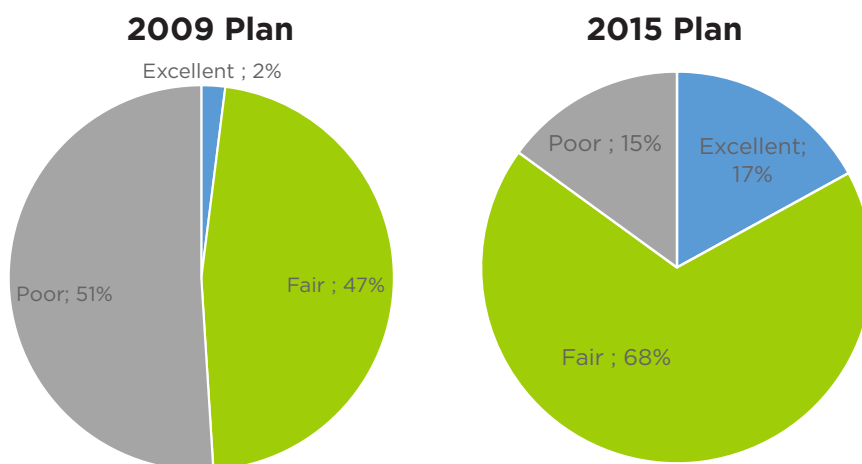


**What type of bicyclist should the City be planning for?**





In the 2009 Plan and 2015 Plan Update, the same question was asked (**How do you rate bicycling conditions?**). It's clear that people believe conditions have improved somewhat; although there is still work to do.



In the 2009 Bicycle Plan, the lack of bicycle facilities was the #1 factor discouraging bicycling with the #2 factor being traffic. When asked again in 2015, those were reversed, but still the top two factors.

### What are the factors that most discourage bicycling in Raleigh?

- #1 - Vehicle traffic (58% of respondents)
- #2 - Lack of bicycle facilities (45% of respondents)
- #3 - Lack of information about where bicycle facilities are located (21% of respondents)

When asked about the **most important roadways to improve**, the majority of respondents chose major arterials that connect large reaches of the City.

### ROADWAYS NEEDING IMPROVEMENT

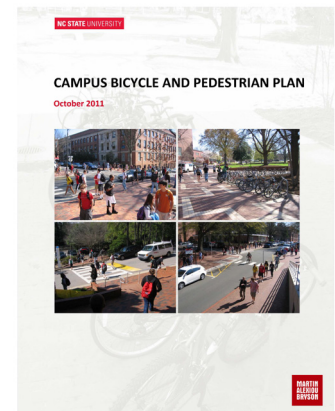
- #1 (tie) - Hillsborough Street
- #1 (tie) - Glenwood Street
- #3 - Capital Blvd
- #4 (tie) - Peace Street
- #4 (tie) - Wade Avenue
- #4 (tie) - Six Forks Road
- #4 - Peace Street
- #8 Atlantic Avenue

## REVIEW OF EXISTING PLANS

The BikeRaleigh plan update is built on a foundation of previous bicycle planning efforts, summarized in the table on page 2-24. This plan aims to enhance the details and intent of past city plans. The following plans reviewed early in the planning process influenced recommendations developed in subsequent chapters:

### ***NCSU CAMPUS BICYCLE & PEDESTRIAN MASTER PLAN***

In 2011, NC State University developed a Campus Bicycle and Pedestrian Plan to make the campus more bikeable and walkable through a variety of facility improvement and program development recommendations. The Plan is a master plan of improvements to meet the long term transportation needs of NC State. But it is also focused on implementation, with specific projects that have been detailed and prioritized. The Campus Bicycle and Pedestrian Plan recommendations will provide key insight as the Raleigh bike network continues to develop and expand around NC State, a main bicycle destination.



### ***RALEIGH BIKE SHARE FEASIBILITY STUDY & IMPLEMENTATION PLAN***

In 2014, the City of Raleigh conducted a feasibility study and implementation plan for a bike share program because of the growing bicycle culture and the commitment to becoming a bicycle friendly community. A bike share system represents a unique opportunity for the City to increase the use of bicycles for relatively short-range travel, reduce the negative impacts of single occupancy vehicles and encourage a shift to other modes of transportation.

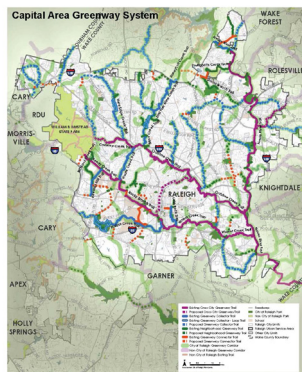
Through a comprehensive analysis of population and employment trends; evaluation of existing plans and regulations; review of existing conditions; and a comprehensive stakeholder and public engagement process, the implementation of a bike share program has been found to be feasible for the City of Raleigh.



The development of a bike share implementation plan is still underway and will provide specific guidance on station locations, system size, fee structure, revenue forecasts, and funding options. Proposed bike share station locations will play a key role in the bike network recommendations in Chapter 3 and the prioritization process developed in Chapter 4.

## CITY OF RALEIGH CAPITAL AREA GREENWAY PLANNING & DESIGN GUIDE

Adopted in 2015, the City of Raleigh Capital Area Greenway (CAG) Planning and Design Guide intends to assist the City of Raleigh in the planning, design, and engineering of greenway trail facilities. This document will serve as a guide to help city staff and consultants select appropriate facilities or treatments given the project context of existing and proposed greenway trails. The Guide supplements the City of Raleigh Parks, Recreation and Cultural Resources System Plan and is intended to be used simultaneously when planning and designing greenways and greenway trails in the CAG System.



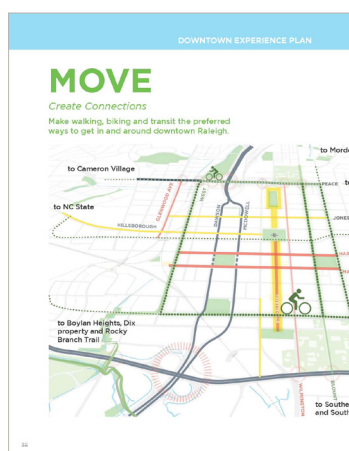
A greenway classification system defines existing and proposed trails as Cross City Greenway Trails, Greenway Collector Trails, Neighborhood Greenway Trails, and Greenway Connectors. Amenities, such as trail width, lighting, and wayfinding, most appropriate for each trail classification are identified. This classification system will play a key role in the development of the on-road bicycle network recommendations.

## RALEIGH DOWNTOWN EXPERIENCE PLAN: THE NEXT 10 YEARS

In 2014, the City kicked-off the development of the Downtown Raleigh Experience Plan, which will serve as a ten year plan for future downtown evolution. The top priority for the Downtown Plan is achievable action items that will continue the transformation of Raleigh's city center. The plan will analyze public realm, infrastructure, connectivity improvements, future development and potential impacts from these action items. The vision statement for the plan is founded on four key themes: breathe, move, stay, and link. The Move: Create Connections theme states: "Make walking, biking, and transit the preferred ways to get in and around downtown Raleigh."

To do this, the plan outlines goals and action steps for each vision theme. The following goal and action steps from the Move theme directly relate to cycling:

- MG2: Provide on-and-off street bicycle facilities and infrastructure that link all the districts to each other and to the major cycling routes into and out of downtown.
- MA-10: Implement pedestrian and bicycle improvements along Person, Blount, and Peace Streets to connect downtown to planned greenway connectors along Pigeon House Branch and Capital Boulevard.



- MA-11: Prioritize West Street as a north-south greenway connector that will connect to greenways north and south of downtown.
- MA-12: Study creating a cycle track along West Street north-south from future park-to-park.
- MA-13: Increase bike lanes throughout downtown, notably along Wilmington and Salisbury Streets.
- MA-14: Implement a Bike Share program in downtown.
- MA-15: Reimagine the Capital City Trail into a multi-cultural historic bike trail circumnavigating the downtown.
- MA-16: Install additional bike corrals in downtown as demand for bike parking grows.
- MA-17: Implement specific design and graphic standards to identify and distinguish the Art to Heart Corridor as well as the envisioned Capital City Trail.
- MA-18: Fund the implementation of the South Park Heritage Trail and connect to other planned trails, creating multiple loop options.

#### OTHER PREVIOUS PLANNING EFFORTS

Title	Year	Bicycle Recommendation
<b>CORRIDOR STUDIES</b>		
Blue Ridge Road District Corridor Study	2012	Bike Lanes from Western Boulevard to Blue Ridge Road/Duraleigh Road
Blount Street/Person Street Corridor Study	2013	One-way Road Diet: Bike Lanes Two-Way Restoration: Bike Lanes and Sharrows
New Bern Avenue Corridor Study	2012	Bike Lanes from Swain Street to Raleigh Boulevard; Wide outside lanes and sidepath recommendation from Raleigh Boulevard to Crabtree Creek
Capital Boulevard Corridor Study	2012	Greenway connection along the west side of Capital Blvd from Peace Street to Atlantic and then switching to the east side of Capital from Atlantic to Crabtree Blvd.
Lake Wheeler Road Corridor Study	2014	Bike Lanes from I-40 to Tryon Road

Title	Year	Bicycle Recommendation
Western Boulevard Corridor Study	2014	Bike Lanes on Avent Ferry Road from Centennial Blvd to Western Blvd; Bike/ped tunnel underneath Western Blvd at Avent Ferry;
Jones Franklin Area Study	2011	Continue multi-use path along Western Boulevard to the Jones Franklin Road intersection and farther south if feasible.
West Morgan Area Study	2011	Greenway connection along the Ash Avenue connector; Bike lanes on West Morgan Street from Hillsborough Street to study limits; Bike lanes on Hillsborough Street from Ashe Ave to study limits
<b>SMALL AREA PLANS/STUDIES</b>		
Crabtree Valley Transportation Area Study	2011	Add bike lanes to Park Lake Avenue; Connect Bicycle/Pedestrian overpass of Glenwood Avenue from Marriott Drive to Crabtree Valley Mall; Improve the intersection of Home-wood Banks and Blue Ridge Road with bike lanes.
Buffalo - New Hope Area Plan	2015	Evaluate Buffalo Road as a high priority route during BikeRaleigh plan update;

The City has a number of active studies and plans that, once adopted, will have specific bicycle recommendations:

- Southern Gateway Corridor Study (South Saunders Street and South Wilmington Street)
- Six Forks Road Corridor Study (I-440 to Spring Forest Road)
- Cameron Village and Hillsborough Street Small Area Plans
- Northwest Raleigh Bicycle Corridors Study



ASSORTMENT OF EXISTING FACILITIES IN RALEIGH

